BRQ Business Research Quarterly (2019) 22, 25–35

www.elsevier.es/brq

REGULAR ARTICLE

Firm and industry effects on small, medium-sized and large firms' performance

Esteban Fernández[a], **Susana Iglesias-Antelo**[b,*], **Vicente López-López**[c], **Marcos Rodríguez-Rey**[d], **Carlos M. Fernandez-Jardon**[e,f]

[a] *Facultad de Economía y Empresa, Departamento de Administración de Empresas, Universidad de Oviedo, Avda. del Cristo, 33006 Oviedo, Spain*
[b] *Facultad de Economía y Empresa, Departamento de Empresa, Universidade da Coruña, Campus de Elviña, 15071 A Coruña, Spain*
[c] *Facultad de Administración de Empresas, Departamento de Organización de Empresas y Comercialización, Universidad de Santiago de Compostela, Alfonso X El Sabio, 27002 Lugo, Spain*
[d] *Instituto Galego de Estatística, Servicio de Estatísticas Empresariais, Complejo administrativo San Lázaro, 15703 Santiago de Compostela, Spain*
[e] *Facultad de Ciencias Económicas y Empresariales, Departamento de Economía Aplicada-ECOBAS, Universidad de Vigo, Campus de Vigo, 36310 Vigo, Spain*
[f] *Idlab, National Research University Higher School of Economics-Perm, Russian Federation*

Received 25 April 2017; accepted 28 June 2018
Available online 1 August 2018

JEL CLASSIFICATION
L11;
L25;
M21

KEYWORDS
Firm effect;
Industry effect;
Firm size;
SMEs;
Organizational performance

Abstract This paper examines whether or not the relative importance of the firm and industry effects in explaining performance variations is the same regardless of the firm size. In relation to size, we think that there has been particular neglect of studying medium-sized firms separately from SMEs in general. That is why we study separately large, medium-sized and small firms. We also contribute to knowledge on the firm-industry debate testing empirically both effects distinguishing the firms by size according to a standard classification in the EU. Our results show that the performances of large and small firms are mainly explained by the firm effect, albeit for different reasons, while the performance of medium-sized firms is explained primarily by the industry effect.

* Corresponding author.
E-mail addresses: esfernan@uniovi.es (E. Fernández), susana.iglesias.antelo@udc.es (S. Iglesias-Antelo), vicente.lopez.lopez@usc.es (V. López-López), marcos.rodrey@gmail.com (M. Rodríguez-Rey), cjardon@uvigo.es (C.M. Fernandez-Jardon).

https://doi.org/10.1016/j.brq.2018.06.005

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Introduction

Understanding the factors that lead to some firms being more competitive than others and therefore achieving greater profitability than their rivals is a subject of concern not only to academics but also to managers. To explain organizational performance, research has focused on two major sources of competitiveness corresponding to the two principal theoretical lines of research. One is Industrial Organization (IO) theory, which follows the logic of the structure-conduct-performance (SCP) paradigm. The first empirical research in this line compared the average profitability of different industries, trying to determine whether or not there were any significant differences associated with their structure. The other is Resource-Based Theory. This considers that it is the heterogeneity of the resources available to companies which determines their differences in performance (Barney et al., 2011), regardless of the industry in which they are competing.

Past research has identified several sources of competitiveness; among others, the firm and industry effects (McGahan, 1999), the effect of strategic groups (González-Fidalgo and Ventura-Victoria, 2002), the business domain effect (Houthoofd et al., 2010), the country effect (Goldszmidt et al., 2011), or the industry life cycle stage effect (Karniouchina et al., 2013). Many studies conclude that the firm and industry effects are the most important and, in spite of having also been the most studied, the analysis of the influence on them of some competitiveness factor, such as size, which could potentially impact on the weight of such effects, require further inquiry.

Research also seems to confirm that the firm effect (heterogeneity of resources) outweighs the industry effect (the industry's structural characteristics) in explaining firms' profitability (Bamiatzi et al., 2016; Bamiatzi and Hall, 2009; Roquebert et al., 1996; Short et al., 2007). However, studies that offer results differentiated by size have generally found that for large companies the firm effect is considerably more important than the industry effect (McGahan, 1999; McGahan and Porter, 2002; Ruefli and Wiggins, 2003), but for small and medium firms the results are contradictory. Specifically, Chang and Singh (2000) and Caloghirou et al. (2004) find the industry effect to be more important than the firm effect in small and medium-sized enterprises (SMEs), while Claver et al. (2002) and Bamiatzi and Hall (2009) conclude just the opposite. And, in this sense, our study adds empirical evidence to the clearly inconsistent findings of these four works.

These works, rather than follow standardized criteria, use different *ad hoc* criteria to establish size categories. In addition, two of them group small and medium-sized firms in the same category, and another one joins up medium-sized and large firms. As a consequence of this disparity of criteria and groupings, we believe that the reality of medium-sized firms may be overshadowed by that of large and/or small firms, and that the evidence that exists to date is not reliable, mainly with regard to them. On the other hand, medium-sized firms have their own idiosyncrasy that makes them different from the rest: they are too small to obtain the economies and capacity of large companies and too large to have the flexibility and dynamism of small firms (Drucker, 1999). Will they also show an idiosyncratic behavior regarding the firm and industry effects?

In summary, in this paper we do not intend to prove the influence of size on profitability, but we try to show that profitability is determined mainly by the industry or by the heterogeneous resources that firms have depending on their size. And, especially, we are interested in distinguishing which of the two effects, firm or industry, prevails in the case of medium-sized firms, not to mention in large and small firms.

In this work we use a broad sample of Spanish firms, both manufacturing and services, extracted from the SABI database (Bureau van Dijk), and we follow the European Commission recommendation of 6 May 2003 (2003/361/EC, DOUE L 124) to define the size categories. First, this allow us to enrich the existing research with an analysis extensible to a population closer to being complete because both the service sector and non-diversified or unlisted firms – often not included – are integrated. Second, the standardized criterion used to classify firms by size is a key point for further research in the EU, in terms of replicability and comparability of results for different countries. And, third and more important, with this segmentation by size we obtain results differentiating clearly medium-sized firms from firms of other sizes, mediating, in this way, in the discrepancy noticed in the literature.

As will be seen later, our results reinforce the theoretical assessments about medium-sized firms made by two management gurus, Porter and Drucker, by showing the predominance of the industry effect in explaining their profitability. However, as in previous studies we find that the performance of large and small firms is mainly explained by the firm effect.

The paper is structured as follows. First, we review the main theoretical lines of research and empirical studies addressing the size-profitability relationship and the firm-industry effect controversy. Second, we present the model and the methodological approach used. Third, we justify and discuss the obtained results. Fourth, we include conclusions and orientations for future research.

Sources of firm profitability

Industrial organization theory

The fundamental IO instrument used in explaining economic profitability is the SCP paradigm. In its traditional formulation (Bain, 1951; Mason, 1939) this postulates a basic direction of causality. The industry's structure affects the firm's conduct, which in turn affects its performance. Originally, most researchers took the approach of studying the structure of the industry and its direct links with the performance achieved. The role of conduct appeared only minimally since it was assumed that the firms pursue the same objective, and adapt more or less passively to the conditions of the industrial structure, i.e., the discretion allowed to the firms was minimized (Arend, 2009). Thus, IO

theory sees the structure of the industry to which the firm belongs as being the main determinant of its profitability.

The concept of industry structure has been introduced into the field of strategic management with few modifications so as to apply it to the formulation of competitive strategy (McWilliams and Smart, 1993). The principal instigator was Porter (1980) who argued that the selection of a competitive strategy is based on two central features: (i) the attractiveness of the industry from the perspective of profitability which is determined by five competitive forces, and (ii) the position the firm occupies within the industry. The basic criterion for a favourable position in the industry is sustainable competitive advantage. This comes primarily from the value the firm creates for its customers. In sum, in the language of the SCP paradigm, the formulation of a competitive strategy is a function of the characteristics of the industry's structure (McWilliams and Smart, 1993).

The Resource-Based Theory

The Resource-Based Theory originated from the work of Penrose (1995). The term was coined by Wernerfelt (1984). It has made significant contributions to the study of the mechanisms underlying firm profitability and value creation for the firm (Barney et al., 2011). In this theory, intrasectoral differences in performance have their origin in an asymmetric distribution of resources among firms. The profits of the most competitive firms are actually Ricardian rents obtained from the possession of superior resources (Peteraf, 1993), i.e., resources that are valuable, rare (scarce), inimitable, and nonsubstitutable (Barney, 1991). These create a competitive advantage difficult to replicate. The intrasectoral dispersion of economic profitability is maintained to the extent that there persists heterogeneity of the resources the firms possess (Penrose, 1995). This in turn depends on the existence of isolation mechanisms (Rumelt, 1984) preventing imitation of the resources that sustain competitive advantage. From this point of view, one can conclude that to compete with any surety the most important thing is not where to compete, but how to compete (Barney, 1991; Peteraf, 1993).

Empirical background: size, performance and firm-industry effect debate

Before the firm-industry effect debate (Rumelt, 1991), the size-profitability relationship was a recurring theme in strategic management research (Villanueva-Villar et al., 2016). In general, it is considered that the size of the firm plays an important role in explaining profitability for several factors; among others, due to the positive effect of economies of scale (Sellers and Alampi-Sottini, 2018), a higher degree of corporate diversification (Benito-Osorio et al., 2018) and a leveraged capability to survive in dynamic environments (Wilden et al., 2013). But results related to size and performance are contradictory (Hamann et al., 2013; Thapa, 2015). In some studies there seems to be a positive relationship (Majumdar, 1997; Serrasqueiro and Nunes, 2008; Lee, 2009; Doğan, 2013; Mule et al., 2015; Sellers and Alampi-Sottini, 2018). But opposite results are obtained in studies like Whittington (1980), in which size does not seem to have an effect on profitability in a sample of UK firms, Becker-Blease et al. (2010), who identified a negative and significant relationship between size and performance in a sample of US manufacturing sectors, and Niresh and Velnampy (2014), who did not find any relationship between size and profitability with a sample of quoted manufacturing firms in Sri Lanka.

As for the relationship between performance and the firm and industry effects, empirical research generally considers the work of Schmalensee (1985) to be the starting point in the study of the industry effect, which was found to explain 19.6% of the variance of the business units' ROA, with the remaining 80.4% being allocated to the error. The industry effect also predominates in the results of the studies of Wernerfelt and Montgomery (1988) and Dunne and Macpherson (1991); all of them with data for US firms.

The most important review of the work of Schmalensee (1985) was due to Rumelt (1991), who used the same database as Schmalensee, but extending the length of the period studied to 1974–1977. Rumelt applied variance components analysis to two different samples (with the second containing smaller business units). The main conclusion was that, for both samples, the firm effect (46.37% and 44.17%) was more important than the industry effect (8.32% and 4.03%), indicating therefore that firms in the same industry differ more than do industries with each other.

In general, there is sufficient evidence to provide support for the idea that the firm effect has greater weight than the industry effect in explaining firms' profitability. This is so regardless of methodological approach, statistical tools, and performance variables used in the different studies. And this support comes from research using databases of firms in both the US (Arend, 2009; Bamiatzi et al., 2016; Hambrick and Quigley, 2014; Hawawini et al., 2003; Karabag and Berggren, 2014; Mauri and Michaels, 1998; McGahan and Porter, 2002; Powell, 1996; Roquebert et al., 1996; Short et al., 2007) and the EU (Bamiatzi and Hall, 2009; Caloghirou et al., 2004; Claver et al., 2002; Eriksen and Knudsen, 2003; Hawawini et al., 2004).

But it is also true that there is a line of research that analyses whether different results are found in the firm and industry effects due to methodological issues linked to sample design (McGahan and Porter, 2002), such as the time period (Bamiatzi et al., 2016; Karniouchina et al., 2013; Mauri and Michaels, 1998), the industry classification system (Chang and Singh, 2000; Claver et al., 2002), the inclusion of both manufacturing and services (Galbreath and Galvin, 2008; McGahan and Porter, 1997), the effect of outliers (Hawawini et al., 2003; McNamara et al., 2005), or the level of country development (Goldszmidt et al., 2011). And it is in this line of research that the study of firm size is inserted, although only Chang and Singh (2000) in the US, and Claver et al. (2002), Caloghirou et al. (2004), and Bamiatzi and Hall (2009) in the EU have addressed this issue, reporting heterogeneous and contradictory results. Neither is there homogeneity in the criteria they used to classify the firms into small, medium, and large. In our view, these findings justify carrying out a more comprehensive study of how firm size might influence the results for the relative weights of the firm and the industry effects in explaining business performance.

Methodology

Sample

The sample was obtained from the SABI (Sistema de Análisis de Balances Ibéricos) database of the Bureau van Dijk. The original sample comprised 14,204 Spanish firms with accounting data for the entire 1995–2004 period, classified by sectors with an NCEA (National Classification of Economic Activities) 3-digit level of disaggregation.

As was stated in the introduction, the criterion used for the definition of size was established following the European Commission's 2003 recommendation. Thus, microenterprises were taken to be those with fewer than 10 employees and turnover of less than 2 million euros; small firms, fewer than 50 employees and turnover not exceeding 10 million euros; medium-sized firms, fewer than 250 employees and up to 50 million euros turnover. Therefore, large firms are those of 250 or more employees and more than 50 million euros turnover. The assignment of each firm to a size category was made taking into account the value of the employment and turnover variables of the last year of the sample period, 2004.

The final sample consisted of 7843 firms, of which 87.58% were small, 10.97% medium, and just 1.45% large. This involves that we focused the analysis on these three firm sizes, discarding microenterprises. We did this although microenterprises represent 45% of the original sample and are significant in the business fabric in Spain: they constitute a way of life for professionals and are very important in the social economy. But their main objective is to obtain a sufficient income to live, and they do not seek to grow or other business-type objectives, mostly because they do not have resources to create a competitive advantage. This means that their behavior does not follow a strategic business model, which would possibly bias the analysis of the importance of each type of effect we carried out here.[1]

Also, it is well-worthy to note that we consider a relatively large time horizon in our sample (1995–2004), covering an expansive phase of the economic cycle. This period is the third of the four decades in democracy in Spain until today, and the one with the highest sustained gross domestic product (GDP) growth without any year of decrease.

Model specification and estimation method

In the literature different alternatives for measuring performance can be found. For example, market share (Chang and Singh, 2000), Tobin's Q (Lin et al., 2018), Altman's Z score (Short et al., 2007), or market value (Hawawini et al., 2003). But when studying firm and industry effects the return on assets (ROA) is the most commonly used (Short et al., 2016) despite its limitations (Aragón-Sánchez and Sánchez-Marín, 2005). In this paper the analysis was carried out using ROA as dependent variable in order to facilitate the comparison of results with those of previous works.

Also for a proper comparison with other papers, the basic model included three possible sources of variation of this profitability, apart from the random error: the firm factor, the stable activity sector factor and the annual impact of the economic cycle. The model was adapted from that proposed by Rumelt (1991). This has five variance components since it disaggregates the activity sector factor into a stable effect and an industry-year interaction effect, and the firm factor into a corporation effect and a business unit effect. But, as in the study of Hawawini et al. (2003), our database does not allow the latter disaggregation. We therefore measured a single effect at the level of the firm, which might have given rise to the industry effect being underestimated. The analytical expression of the model is as follows:

$$r_{ijt} = \mu + \alpha_i + \beta_j + \gamma_t + \varepsilon_{ijt}$$

where r_{ijt} is the return on assets of firm j in sector i in year t; μ is the constant of the model representing the mean overall return; α_i represents the effect that the defining characteristics of activity sector i have on organizational performance; β_j is identified with the firm effect induced by the particular provision of resources available to the firm; γ_t is the temporal effect reflecting yearly macroeconomic changes; and ε_{ijt} is the disturbance or error term, i.e., the ROA of firm j in sector i that the model does not explain in year t.

In the measurement of the relative importance of the various effects, we applied a hierarchical linear modelling (HLM) and a variance components analysis (VCA) or random effects model. VCA provides estimators of the variability of each of the components of the equation, and therefore provides exploratory information about the importance of each element. HLM allows to test whether this prior information can be considered significant or not. Some examples of application of HLM and VCA in the firm-industry effect debate can be found, among others, in the works of Short et al. (2007) and Chen (2010), who obtained different results with both methodologies. The more traditional VCA has been used in other studies, both in the pioneering work of Rumelt (1991) and McGahan and Porter (1997), and in later work such as that of Chang and Singh (2000) and Xia and Walker (2015).

On the one hand, HLM allows study the random effects in different levels of analysis. To contrast the introduction of each one of these effects, the study uses likelihood ratio (LR) tests that, although they are conservative, they indicate the importance of the introduction of a new factor in the model. The method generates a 95% confidence interval of each standard deviation. This interval allows comparing the different variances. STATA 14.0 is used to do the calculations.

On the other hand, VCA considers that each factor's levels found in the sample are randomly selected, but the conclusions from the experimentation are induced over all the possible levels that can exist in the population (Hair et al., 2010). This means that it is not necessary to have data on the entire population in order to generalize the conclusions derived from the results. This is appropriate given the impos-

[1] Notwithstanding this, we have observed that the results of the explanatory power of the firm and industry effects for microenterprises do not differ substantially from those of small firms, which will be shown below in Table 3.

Table 1 Means and standard deviations of ROA by period and firm size.

Year	Large		Medium		Small	
	Mean	SD	Mean	SD	Mean	SD
1995	1.60	14.89	2.19	38.46	1.07	19.88
1996	0.87	16.56	2.43	14.89	2.66	15.54
1997	3.78	17.39	4.59	11.37	3.53	13.82
1998	2.04	29.92	4.61	15.83	4.37	10.20
1999	4.54	9.57	5.53	8.93	4.60	11.19
2000	4.24	8.87	5.18	11.08	4.16	8.55
2001	4.43	9.74	4.84	9.40	3.93	9.62
2002	2.17	22.37	4.21	8.18	3.68	10.15
2003	4.40	8.39	3.76	15.43	3.56	9.58
2004	4.54	11.91	4.58	8.55	2.96	11.64
1995–2004	3.26	16.33	4.19	16.61	3.45	12.50

sibility of working with all the firms in each sector and all sectors (Hawawini et al., 2003). Since Rumelt uses variance components analysis, is with this technique that we include in our model, as in Rumelt (1991), the industry-year interaction effect (δ_{it}), i.e., the impact the business cycle has on the firm's activity sector. Thus, the model to be tested by means of VCA is:

$$r_{ijt} = \mu + \alpha_i + \beta_j + \gamma_t + \delta_{it} + \varepsilon_{ijt}$$

The effects measured and the random error are normally distributed with zero mean and variances $\sigma_\alpha{}^2$, $\sigma_\beta{}^2$, $\sigma_\gamma{}^2$, $\sigma_\delta{}^2$, and $\sigma_\varepsilon{}^2$, respectively, and are generated by mutually independent random processes. Consequently, this method decomposes the variance of the dependent variable as follows:

$$\sigma_r^2 = \sigma_\alpha^2 + \sigma_\beta^2 + \sigma_\gamma^2 + \sigma_\delta^2 + \sigma_\varepsilon^2$$

The estimation of variance components was performed using the function *lmer* of the *lme4* library of the *R* statistical language (Bates and Maechler, 2009; R Core Team, 2014) to optimize an objective function, resulting in solving a penalized weighted least squares (PWLS) problem.

Results

For descriptive statistics, we have calculated the means and standard deviations of ROA by year and by firm size (Table 1). The table shows that there is no set order over time, although in most years and for the overall period the medium firms have the highest returns. A t-test of equality of means allows to verify that the difference of returns of medium firms versus others is statistically significant at a level of 5% (t value = −9.5934), which suggests the existence of a certain relationship between organizational size and profitability.

As discussed in the introduction, we believe that the pooling of firms of different sizes in the same category, as carried out in previous studies, has led to that the reality of medium-sized firms has been overshadowed by that of large and/or small firms. The results obtained in the analysis of variance components of organizational performance with the full sample, without distinguishing by size, serve as evidence (see Table 2). These show that the firm effect has the greatest explanatory power, while the industry effect is less important. It is also observed that a significant part of the variance of ROA is not explained by the model. As will be seen below, these results are in line with those obtained for both large and small firms separately.

Table 2 Variance component analysis of ROA with the full sample.

Effect	All firms	
	Estimate	%
Firm	26.84	12.71
Industry	7.08	3.35
Year	1.00	0.48
Industry-year	0.73	0.34
Residual	175.49	83.12
Total	156.82	100.00

The results of the variance components analysis and the hierarchical linear modelling by size are summarized in Table 3, and a visual comparison of the variance components analysis provided in the bar chart of Fig. 1. It is important to highlight that the assumption of time being a random effect can be questionable; that is why with HLM we have considered time a fixed effect. This different consideration may lead to that some of the results present certain discrepancies, although, overall, the results are similar. In fact, one appreciates coincidence among all three firm sizes in the lack of importance of the temporal random effect in VCA, which is practically non-existent in the two larger size groups.

VCA methodology shows that in the smaller organizations the firm effect is by far the most important, followed by the sector effect, while the transient industry effect is the least explanatory. In the case of large firms, the transient industry effect explains almost as much as the firm effect, but the stable component of the industry effect has no significance whatever. In the case of medium-sized firms, the importance of the industry effect is eight times that of the firm effect, and is almost equally split between its two components, stable and transient. Consequently, the relative importance of the firm effect is greater than that of the industry effect in both large and small firms, and the opposite is the case in the medium-sized firms.

These results are also obtained with the HLM methodology, although the greater importance of the industry effect in the case of medium-sized firms is not overwhelming. This can also be seen in Table 4, which shows that the industry effect is more important than the firm effect in medium-sized firms, although the difference between effects is not significant. In contrast, for large and small organizations the firm effect prevails and it is significantly greater than the industry effect. Likewise, confidence intervals show that the industry effect is more important in medium-sized than in large and small firms, while the firm effect is more important in large firms than in the others.

Table 3 VCA and HLM analysis of ROA according to firm size.

Effect	Large				Medium				Small			
	VCA	%	HLM	%	VCA	%	HLM	%	VCA	%	HLM	%
Firm	49.05	17.99	48.21	18.21	19.44	5.07	15.80	5.61	21.35	13.62	21.27	13.64
Industry	0.00	0.00	0.00	0.00	71.69	18.71	14.54	5.17	1.46	0.93	1.49	0.96
Year	0.24	0.09	***	n.a.	0.07	0.02	***	n.a.	0.87	0.55	***	n.a.
Industry-year	41.56	15.24	n.a.	n.a.	77.78	20.29	n.a.	n.a.	0.83	0.53	n.a.	n.a.
Residual	181.81	66.68	216.52	81.79	214.26	55.91	251.17	89.22	132.31	84.37	133.15	85.40
Total	272.66	100.00	264.73	100.00	383.24	100.00	281.51	100.00	156.82	100.00	155.91	100.00

n.a.: not available.
*** Significant at 0.1%.

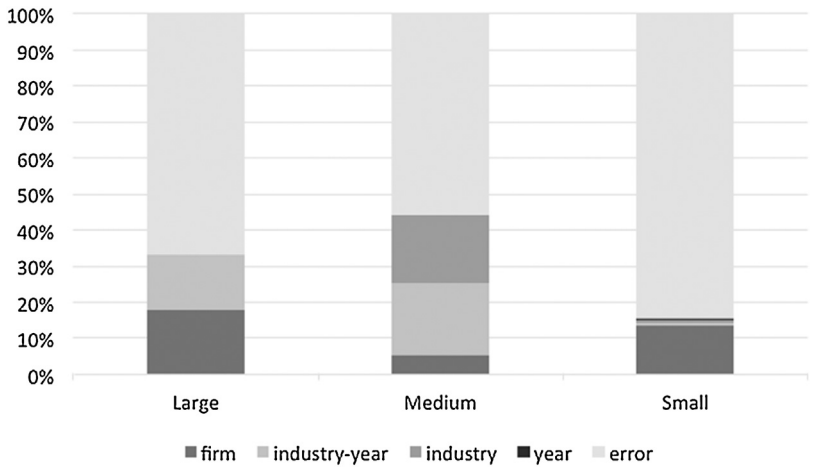

Figure 1 Percentage contributions to the variance components analysis of ROA according to firm size.

Table 4 HLM standard deviation estimates and effects.

	Random effects parameters								
	Large			Medium			Small		
Effect	Estimate	Standard error	95% Confidence interval	Estimate	Standard error	95% Confidence interval	Estimate	Standard error	95% Confidence interval
Firm	6.94	0.67	5.75–8.39	3.98	0.30	3.43–4.61	4.61	0.07	4.48–4.74
Industry	0.00	0.00	0.00–0.00	3.81	0.61	2.79–5.20	1.22	0.20	0.88–1.70
Residual	14.71	0.32	14.09–15.37	15.85	0.13	15.60–16.10	11.54	0.03	11.48–11.60

LR test vs. linear model: chi2(2) = 3880.90 Prob > chi2 = 0.000.

Discussion

As was noted before, there have been four previous studies that have differentiated firms according to their size. We shall compare their results with those we have obtained by means of VCA for homogeneity reasons, since this methodology is used in two of them (see Table 5). However, the disparity of the criteria used to segment the samples by size in the whole five studies, as well as the selected dependent variables, should be borne in mind.

Thus, Chang and Singh (2000) identify the firm effect as the most important in the case of large firms (47.6%), while the industry effect predominates in small and medium firms (54.2% and 40.6%, respectively). Also noteworthy is the model's small percentage error (23.2%). While one could say that these results coincide with our observations with regard to the importance of the firm effect in the case of large firms (17.99%), of the other firms in our study, only the medium-sized firms present a greater weight of the industry effect. Nevertheless, this should be seen in the light of the divergence of criteria used in both works, in particular, that the small firm category of Chang and Singh (2000) could be equivalent to our categories of medium and small firms together. Such divergence of criteria impedes a proper comparison of the results.

Table 5 Relative importance of the effects: comparison of the results of different studies.

	Chang and Singh (2000)			Claver et al. (2002)			Caloghirou et al. (2004)		Bamiatzi and Hall (2009)			Our research		
Effect (%)	Large	Medium	Small	Large	Medium	Small	Large	SMEs	Large	SMEs	Micro	Large	Medium	Small
Firm	47.6	8.8	8.9	46.26	32.43	44.31	48.2 (ΔR^2)	6 (ΔR^2)	0.682* (beta)	0.508* (beta)	0.644* (beta)	17.99	5.07	13.62
Industry	19.3	40.6	54.2	3.96	7.14	0	16.3 (ΔR^2)	14.6 (ΔR^2)	0.321* (beta)	0.088* (beta)	0.089* (beta)	0	18.71	0.93
Year	0.4	0.3	0.1	0.1	0.17	0.54	NS	NS	NS	NS	NS	0.09	0.02	0.55
Industry-year	NS	NS	NS	3.7	4.21	1.87	NS	NS	NS	NS	NS	15.24	20.29	0.53
Corporation	9.5	27.3	15.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Residual	23.2	23.1	21.1	45.98	56.05	53.28	34	78	69.1	83.8	53.4	66.68	55.91	84.37
Methodology	VCA			VCA			Regression		Moderated regression			VCA		
Size criterion	893–121,000 million $ (total sales)	171–893 million $ (total sales)	2–170 million $ (total sales)	5.5–150.7 million € turnover	2.1–5.5 million € turnover	0.5–2.1 million € turnover	>250 employees	≤250 employees	>50 million € turnover	2–50 million € turnover	<2 million € turnover	>250 employees and >50 million € turnover	50–250 employees and 10–50 million € turnover	10–50 employees and 2–10 million € turnover
Dependent variable	Market share			ROA			Subjective profitability		ROA			ROA		
Country	USA			Spain			Greece		UK			Spain		
Sample	709			679			280		67,640			7,843		
Years	1981–89			1994–98			1999		2002–04			1995–04		

NS: non-studied.

* (Not %).

In the study of Claver et al. (2002) the firm effect is greater than the industry effect regardless of the size of the firm. This largely coincides with the results of our study, although for medium-sized firms we found the relationship to be reversed (approximately 39% of variance explained by the industry and industry-year effects and 5.07% by the firm effect). This is explained because it is our small firms which should be compared with their medium ones – in which case, the two sets of results agree in the preponderance of the firm effect –, and our medium and large firms together should be compared with their large firms. And we would obtain a result of preponderance of the firm effect, as they obtain, because, in the aggregation, the reality of the medium-sized company is hidden by that of the large.

In relation to Caloghirou et al. (2004), their results are similar to ours in terms of the models' explanatory power, despite the different methodological approaches. The explanatory power of their model depends greatly, however, on firm size since it explains 66% of the variance in large firms and only 22% in SMEs. This coincides in part with our results in which the percentage of variance explained in small firms is about 16%, increasing to 33% in large firms, and to 44% in medium-sized firms. In both studies the firm effect exceeds the industry effect in large firms. However, it is not reasonable to compare the other firms of the two studies since their SMEs are equivalent to our small and medium firms together. Although one can compare their SMEs with the small firms of Chang and Singh (2000), for which the two sets of results agree on the relative importance of the industry effect as against the firm effect.

Our results are very similar to those of Bamiatzi and Hall (2009) in relation to the models' explanatory power for different firm sizes, and also in that the firm effect is the most important in the large firms. However, since they group small and medium sizes into a single category, the two sets of results are not comparable for the other firms. Also noteworthy is that they find the firm effect to be the more important independently of size, which is contrary to what Caloghirou et al. (2004) found for SMEs, applying the same procedure than them to distinguish among firms by size.

In sum, the primacy of the firm effect in large companies is observed systematically in the results of all the works. This seems to leave beyond doubt the paramount importance of the firm effect for this type of organization.

For small firms, however, the results are mixed and difficult to extrapolate. Given that the size criterion for medium-sized firms in Claver et al. (2002) is the same as the criterion used for small firms in the present work, we would highlight that the firm effect also seems to be the more important in small organizations in Spain.

Comparison between the American study and ours is not strictly possible due to the different mean firm sizes, conditioned by the business environment and market of each country. Nonetheless, it is the only other study that makes a clear distinction between large, small, and medium-sized firms, and it also finds that the industry effect is more important for medium-sized firms. This question is important because the grouping of small and medium firms into a single category (SMEs) may have led to the contradictory results of Caloghirou et al. (2004) and Bamiatzi and Hall (2009).

In summary, all the studies reviewed and ours are aligned in the identification of the importance of the firm effect in the case of large companies. So we can accept it, even though the mean size of the large Spanish and other European countries firms is markedly less than that of the US firms. However, this coincidence is not observed in the case of small and medium firms. The inconsistent results of the previous studies may be due not only to the different criteria followed to divide the samples by size, but also to the fact of grouping into a single category small and medium-sized firms, as Caloghirou et al. (2004) and Bamiatzi and Hall (2009) do. When the focus is strictly on the medium-sized organizations, as we and Chang and Singh (2000) have done, it is observed that the industry effect is the one that prevails. While in the case of small firms, and at least in Spain, it is the firm effect that seems to have some importance. Issues that are undoubtedly due to the peculiar characteristics of each group of organizations.

Finally, there also stands out the lower explanatory power of the models using data of European firms. In our view, this may be explained by the conjunction of various factors: (i) the dependent variable used is profitability in the European studies and market share in the American study; (ii) the mean size of firms in the American study is markedly greater than that of the European studies; and (iii) in the American study, Chang and Singh (2000) only include manufacturing firms, while most other studies include service firms, and this can lead to a major difference in explanatory power of the firm effect which is greater in magnitude for manufacturers than for services.

Conclusions

In this paper we have carried out an analysis whose purpose was to verify whether the relative importance of the firm and industry effects was the same regardless of the firm size. Our findings have shown that this is not the case. We have found that the performance of large and small firms is mainly explained by the firm effect, that is, by idiosyncratic attributes of the firms. However, we think that those attributes are different for each group. In the case of large firms, their size and creative accumulation allow them to attain competitive advantages in both differentiation and costs. In their flexibility and dynamism small firms have an important advantage with which to face competition. As for the performance of medium-sized firms, it results to be primarily explained by the industry effect. In our opinion, the reason is that, because of their ''wrong'' size, they are disadvantaged competitively with respect to both small and large firms, so that their profitability can only be explained due to their participating in a highly profitable industry in which competitive intensity is low.

This paper also shows that firm size had not been explored properly or in detail in the firm-industry debate for various reasons. On the one hand, even though studies of the relative importance of the industry and firm effects are among the most prolific in the strategic management field, they have mainly focused on large companies. On the other hand, in those works which focus on firms of all sizes, small and medium-sized companies have hardly been studied separately; instead, normally a single category of SMEs has

been used. In addition, there is also a lack of uniformity when classifying firms according to their size, so that each research establishes its own typology of firms, making it difficult – if not impossible – to compare results. In our opinion, these questions – in fact, idiosyncratic characteristics of the samples – are key to explain that in the literature not only conclusive results have not yet been obtained, but contradictory results have been found, especially for small and medium-sized enterprises.

In this sense, the present study has contributed to the knowledge on the subject by contrasting the firm and industry effects with the firms distinguished by size according to a standard EU classification, which is a key point for further research in the EU in terms of replicability and comparability of results for different countries. It has also contributed with a complete sample which includes manufacturing, services, diversified, non-diversified, listed and unlisted firms, and for a broad time period. And, above all, it has not neglected the study of medium-sized firms, the great forgotten segment in strategic research. What is more, we would like to emphasize the need to focus on this size of company.

In relation to this last point, our findings have managerial implications. As mentioned above, Peter Drucker, business management guru, believes that medium-sized firms represent the wrong size, because they are too small to obtain the economies and capacity of large companies and too large to have the flexibility and dynamism of small firms (Drucker, 1999). These characteristics lead to a positioning in the middle, which, as Porter (1980) considers, is a competitive suicide: they do not develop a competitive advantage neither in differentiation nor in costs. However, the results of our research show that medium-sized firms can be very profitable if they compete in the right sector. Therefore, the managers of medium-sized firms to achieve a profitability above the average do not have as an only alternative to increase the size, as most scholars point out. They can also achieve high returns if they compete in favourable (key) sectors.

Or in other words, our results reveal a peculiarity related to firm growth. In the profitability of medium-sized firms, the sector in which they compete weighs more than the resources and capabilities they possess; whereas the opposite happens with large firms. Therefore, if a successful medium-sized firm considers that its earnings depend basically on the resources and capabilities that it owns and not on the sector where it competes, it could embark on the path of growth without developing its own nuclear capabilities, which would lead to a deterioration in competitiveness. Medium-sized firms should not grow by hoarding more resources, but by internally developing nuclear capabilities. The same is not true for small firms.

Our findings also have theoretical implications. The firm-industry effect debate is the empirical view of the theoretical controversy IO versus RBT. The winner to date in this controversy is the RBT, since the prevalence of the firm effect versus the industry effect is observed more frequently in practice. However, we have seen how a technical issue, such as a segmentation by a certain size criterion, can hide a result like the one observed in relation to medium-sized companies: a result favourable to the sector effect compared to the firm effect. Which supposes a support to the IO. This leads us to conclude that the sector effect may have been underestimated in the literature and, therefore, the IO may have received less support than it would deserve. Likewise, the results show that both theories are important, since the postulates of the IO are more relevant for the medium-sized companies, while those of the RBT are better guides for the large and small ones.

We must not fail to mention that this study has some limitations, mainly related to the database used. First, it does not provide profitability data disaggregated by business unit. For this reason, in the analysis we were unable to separate the business unit effect from the corporate effect, but instead, we measured a conjoint firm effect, which surely meant a poorer measure of this effect. Second, it does not contain data from other countries, which prevents further generalization of the results obtained.

Finally, as far as future research is concerned, we find it very interesting to replicate the analysis in a group of countries, and to extend it to the manufacturing versus services context. The literature about the firm-industry debate consists predominantly of work with samples of US firms, mainly large and diversified, primarily in manufacturing sectors, and often excluding service-related firms. In our opinion, it is therefore not surprising that empirically these studies found the firm effect to be that with the greatest explanatory power of organizational performance, partly as a result of applying tests that tended to exclude smaller firms, but perhaps also because many analyses excluded the service sector. And although our sample included service companies, we have not studied yet the industry and firm effects separately for manufacturers and services.

References

Aragón-Sánchez, A., Sánchez-Marín, G., 2005. Strategic orientation, management characteristics, and performance: a study of Spanish SMEs. J. Small Bus. Manag. 43, 287–308, http://dx.doi.org/10.1111/j.1540-627X.2005.00138.x.

Arend, R.J., 2009. Industry effects and firm effects: no effect is an island. J. Bus. Res. 62, 651–659, http://dx.doi.org/10.1016/j.jbusres.2008.02.002.

Bain, J.S., 1951. Relation of profit rate to industry concentration: American manufacturing, 1936–1940. Q. J. Econ. LXV, 293–324.

Bamiatzi, V., Bozos, K., Cavusgil, S.T., Hult, G.T.M., 2016. Revisiting the firm, industry and country effects on profitability under recessionary and expansion periods: a multi-level analysis. Strateg. Manag. J. 37, 1448–1471, http://dx.doi.org/10.1002/smj.2.

Bamiatzi, V., Hall, G., 2009. Firm versus sector effects on profitability and growth: the importance of size and interaction. Int. J. Econ. Bus. 16, 205–220, http://dx.doi.org/10.1080/13571510902917517.

Barney, J., 1991. Firm resources and sustained competitive advantage. J. Manage. 17, 99–120, http://dx.doi.org/10.1177/014920639101700108.

Barney, J.B., Ketchen, D.J., Wright, M., 2011. The future of resource-based theory: revitalization or decline? J. Manage. 37, 1299–1315, http://dx.doi.org/10.1177/0149206310391805.

Bates, D., Maechler, M., 2009. Package ''lme4'' (Version 0.999375-32): linear mixed-effects models using S4 classes [WWW Document]. http//cran.r-project.org/web/packages/lme4/lme4.pdf. URL http://cran.r-project.org/package=lme4 (accessed 7.1.14).

Becker-Blease, J.R., Kaen, F.R., Etebari, A., Baumann, H., 2010. Employees, firm size and profitability in US manufacturing industries. Invest. Manag. Financ. Innov. 7, 7–23.

Benito-Osorio, D., Colino, A., Guerras-Martín, L.Á., Zúñiga-Vicente, J.Á., 2016. The international diversification-performance link in Spain: Does firm size really matter? Int. Bus. Rev. 25, 548–558, http://dx.doi.org/10.1016/j.ibusrev.2015.09.004.

Caloghirou, Y., Protogerou, A., Spanos, Y., Papagiannakis, L., 2004. Industry-versus firm-specific effects on performance: Contrasting SMEs and large-sized firms. Eur. Manag. J. 22, 231–243, http://dx.doi.org/10.1016/j.emj.2004.01.017.

Chang, S.-J., Singh, H., 2000. Corporate and industry effects on business unit competitive position. Strateg. Manag. J. 21, 739–752, http://dx.doi.org/10.1002/1097-0266(200007)21:7<739::AID-SMJ117>3.0.CO;2-Q.

Chen, Y.M., 2010. The continuing debate on firm performance: A multilevel approach to the IT sectors of Taiwan and South Korea. J. Bus. Res. 63, 471–478, http://dx.doi.org/10.1016/j.jbusres.2009.04.004SU.

Claver, E., Molina, J., Tari, J., 2002. Firm and industry effects on firm profitability: A Spanish empirical analysis. Eur. Manag. J. 20, 321–328, http://dx.doi.org/10.1016/S0263-2373(02)00048-8.

Doğan, M., 2013. Does firm size affect the firm profitability? Evidence from Turkey. Res. J. Financ. Account. 4, 53–59.

Drucker, P.F., 1999. Management: Task, Responsibilities, Practices. Burlington, Massachusetts.

Dunne, T., Macpherson, D.A., 1991. A note on ownership and performance in manufacturing firm. South. Econ. J. 57, 1164–1169.

Eriksen, B., Knudsen, T., 2003. Industry and firm level interaction implications for profitability. J. Bus. Res. 56, 191–199, http://dx.doi.org/10.1016/S0148-2963(01)00220-X.

Galbreath, J., Galvin, P., 2008. Firm factors, industry structure and performance variation: New empirical evidence to a classic debate. J. Bus. Res. 61, 109–117, http://dx.doi.org/10.1016/j.jbusres.2007.06.009.

Goldszmidt, R.G.B., Brito, L.A.L., de Vasconcelos, F.C., 2011. Country effect on firm performance: A multilevel approach. J. Bus. Res. 64, 273–279, http://dx.doi.org/10.1016/j.jbusres.2009.11.012.

González-Fidalgo, E., Ventura-Victoria, J., 2002. How much do strategic groups matter? Rev. Ind. Organ. 21, 55–71, http://dx.doi.org/10.1023/A:1016001219134.

Hair, J.F., Tatham, R.L., Anderson, R.E., Black, W.C., 2010. Multivariate Data Analysis, 5th ed. Pearson, New Jersey.

Hamann, P.M., Schiemann, F., Bellora, L., Guenther, T.W., 2013. Exploring the dimensions of organizational performance: a construct validity study. Organ. Res. Methods 16, 67–87.

Hambrick, D.C., Quigley, T.J., 2014. Toward more accurate contextualization of the CEO effect on firm performance. Strateg. Entrep. J. 35, 473–491, http://dx.doi.org/10.1002/smj.

Hawawini, G., Subramanian, V., Verdin, P., 2004. The home country in the age of globalization: How much does it matter for firm performance? J. World Bus. 39, 121–135, http://dx.doi.org/10.1016/j.jwb.2003.08.012.

Hawawini, G., Subramanian, V., Verdin, P., 2003. Is performance driven by industry – or firm-specific factors? A new look at the evidence. Strateg. Manag. J. 24, 1–16, http://dx.doi.org/10.1002/smj.278.

Houthoofd, N., Desmidt, S., Fidalgo, E.G., 2010. Analyzing firm performance heterogeneity: the relative effect of business domain. Manag. Decis. 48, 996–1009, http://dx.doi.org/10.1108/00251741011053505.

Karabag, S.F., Berggren, C., 2014. Antecedents of firm performance in emerging economies: business groups, strategy, industry structure, and state support. J. Bus. Res. 67, 2212–2223, http://dx.doi.org/10.1016/j.jbusres.2014.01.004.

Karniouchina, E.V., Carson, S.J., Short, J.C., Ketchen, D.J., 2013. Extending the firm vs. industry debate: does industry life cycle stage matter? Strateg. Manag. J. 34, 1010–1018, http://dx.doi.org/10.1002/smj.

Lee, J., 2009. Does size matter in firm performance? Evidence from US public firms. Int. J. Econ. Bus. 16, 189–203, http://dx.doi.org/10.1080/13571510902917400.

Lin, F.J., Chen, Y.M., Lo, F.Y., 2014. The persistence of economic profit. Int. Entrep. Manag. J. 10, 767–780, http://dx.doi.org/10.1007/s11365-013-0248-5.

Majumdar, S.K., 1997. The impact of size and age on firm-level performance: some evidence from India. Rev. Ind. Organ. 12, 231–241, http://dx.doi.org/10.1023/A:1007766324749.

Mason, E.S., 1939. Price and production policies of large-scale enterprise. Am. Econ. Rev. 29, 61–74.

Mauri, A.J., Michaels, M.P., 1998. Firm and industry effects within strategic management: an empirical examination. Strateg. Manag. J. 19, 211–219, http://dx.doi.org/10.1002/(SICI)1097-0266(199803)19:3<211::AID-SMJ947>3.0.CO;2-T.

McGahan, A.M., 1999. The performance of US corporations: 1981–1994. J. Ind. Econ. 47, 373–398.

McGahan, A.M., Porter, M.E., 2002. What do we know about variance in accounting profitability? Manage. Sci. 48, 834–851, http://dx.doi.org/10.1287/mnsc.48.7.834.2816.

McGahan, A.M., Porter, M.E., 1997. How much does industry matter, really? Strateg. Manag. J. 18, 15–30, 10.1002/(SICI)1097-0266(199707)18:1+<15::AID-SMJ916>3.3.CO;2-T.

McNamara, G., Aime, F., Vaaler, P.M., 2005. Is performance driven by industry- or firm-specific factors? A response to Hawawini, Subramanian, and Verdin. Strateg. Manag. J. 26, 1075–1081, http://dx.doi.org/10.1002/smj.496.

McWilliams, A., Smart, D.L., 1993. Efficiency v. structure-conduct-performance: implications for strategy research and practice. J. Manage. 19, 63–78, http://dx.doi.org/10.1177/014920639301900105.

Mule, R.K., Mukras, M.S., Mutunga, N.O., 2015. Corporate size, profitability and market value: an econometric panel analysis of listed firms in Kenya. Eur. Sci. J. 11, 376–396.

Niresh, J.A., Velnampy, T., 2014. Firm size and profitability: a study of listed manufacturing firms ed manufacturing firms in Sri Lanka. Int. J. Bus. Manag 9, 57–64, http://dx.doi.org/10.5539/ijbm.v9n4p57.

Penrose, E., 1995. The Theory of the Growth of the Firm. Oxford University Press, Great Britain, http://dx.doi.org/10.1093/0198289774.001.0001.

Peteraf, M.A., 1993. The cornerstones of competitive advantage: a resource-based view. Strateg. Manag. J. 14, 179–191, http://dx.doi.org/10.1002/smj.4250140303.

Porter, M.E., 1980. Competitive Strategy: Techniques for Analyzing Industries and Competitors. Free Press, New York.

Powell, T.C., 1996. How much does industry matter? An alternative empirical test. Strateg. Manag. J. 17, 323–334, http://dx.doi.org/10.1002/(SICI)1097-0266(199604)17:4<323::AID-SMJ803>3.0.CO;2-5.

Roquebert, J.A., Phillips, R.L., Westfall, P.A., 1996. Markets vs. management: what ''drives'' profitability? Strateg. Manag. J. 17, 653–664, http://dx.doi.org/10.1002/(SICI)1097-0266(199610)17:8<653::AID-SMJ840>3.0.CO;2-O.

Ruefli, T.W., Wiggins, R.R., 2003. Industry, corporate, and segment effects and business performance: a non-parametric approach. Strateg. Manag. J. 24, 861–879, http://dx.doi.org/10.1002/smj.350.

Rumelt, R.P., 1991. How much does industry matter? Strateg. Manag. J. 12, 167–185, http://dx.doi.org/10.1002/smj.4250120302.

Rumelt, R.P., 1984. Towards a strategic theory of the firm. In: Lamb, R.B. (Ed.), Competitive Strategic Management. Prentice Hall, Englewood Cliffs, pp. 556–570.

Schmalensee, R., 1985. Do markets differ much? Am. Econ. Rev. 75, 341–351.

Sellers, R., Alampi-Sottini, V., 2016. The influence of size on winery performance: evidence from Italy. Wine Econ. Policy 5, 33–41, http://dx.doi.org/10.1016/j.wep.2016.03.001.

Serrasqueiro, Z.S., Nunes, P.M., 2008. Performance and size: empirical evidence from Portuguese SMEs. Small Bus. Econ. 31, 195–217, http://dx.doi.org/10.1007/s11187-007-9092-8.

Short, J.C., Ketchen Jr, D.J., Palmer, T.B., Hult, G.T.M., 2007. Firm, strategic group, and industry influences on performance. Strateg. Manag. J. 28, 147–167, http://dx.doi.org/10.1002/smj.

Short, J.C., Mckenny, A.F., Ketchen, D.J., Snow, C.C., Hult, T.M., 2016. An empirical examination of firm, industry, and temporal effects on corporate social performance. Bus. Soc. 55, 1122–1156, http://dx.doi.org/10.1177/0007650315574848.

Team, R.C., 2014. R: A language and environment for statistical computing. R Foundation for Statistical Computing [WWW Document]. http://www.r-project.org/ (accessed 12.1.16).

Thapa, A., 2015. Determinants of microenterprise performance in Nepal. Small Bus. Econ. 45, 581–594, http://dx.doi.org/10.1007/s11187-015-9654-0.

Villanueva-Villar, M., Rivo-López, E., Lago-Peñas, S., 2016. On the relationship between corporate governance and value creation in an economic crisis: empirical evidence for the Spanish case. BRQ Bus. Res. Q. 19, 233–245, http://dx.doi.org/10.1016/j.brq.2016.06.002.

Wernerfelt, B., 1984. A resource-based view of the firm. Strateg. Manag. J. 5, 171–180, http://dx.doi.org/10.1002/smj.4250050207.

Wernerfelt, B., Montgomery, C.A., 1988. Tobin's q and the importance of focus in firm performance. Am. Econ. Rev. 78, 246–250, http://dx.doi.org/10.2307/1814713.

Whittington, G., 1980. The profitability and size of United Kingdom companies, 1960–74. J. Ind. Econ. 28, 335–352, http://dx.doi.org/10.2307/2098066.

Wilden, R., Gudergan, S.P., Nielsen, B.B., Lings, I., 2013. Dynamic capabilities and performance: strategy, structure and environment. Long Range Plann. 46, 72–96, http://dx.doi.org/10.1016/j.lrp.2012.12.001.

Xia, F., Walker, G., 2015. How much does owner type matter for firm performance? Manufacturing firms in China 1998–2007. Strateg. Manag. J. 36, 576–585, http://dx.doi.org/10.1002/smj.